

Remarks

In response to the final Office Action dated November 4, 1999, Applicants respectfully request reconsideration. To further the prosecution of this application, each of the claim rejections has been considered, and is addressed below.

Initially, Applicants note that claim 53 has been amended. In the process of preparing this response, it was noted that an antecedent basis problem existed with respect to the reference in claim 53 to "the network cloud", rather than to "the at least one communication link." Accordingly, claim 53 has been amended to correct this inconsistency. The amendment has been made solely for clarification purposes, rather than to distinguish over the prior art of record.

In ¶3 of the Office Action, claims 1-3, 10-11, 18-19, 39-41, 46-49, 51-52 and 61 (which include independent claims 1, 39, 47 and 61) are rejected under 35 U.S.C. §103 as being obvious over Ohran in view of Ofek. This rejection is respectfully traversed.

In the first Office Action, this same group of claims was rejected under 35 U.S.C. §102 as being anticipated by Ohran. In response, the independent claims were amended to recite the mirroring of information as being done in response to information being written to the storage system. In the final Office Action, the Examiner agrees that Ohran does not disclose mirroring in response to information being written from the CPU to the storage system, but indicates that Ofek discloses a mirroring controller that is responsive to information being written from the CPU to a first storage system to mirror at least some of the information to a second storage system "by transferring the at least some of the information through the network cloud." (Office Action, page 3). The Examiner concludes that one of ordinary skill in the art would have been motivated to modify Ohran's system "to mirror data to the secondary (backup) storage system in response to the CPU writing data to the primary storage system for the desirable purpose of increased reliability and to improve the performance of the system." (Office Action, page 4).

Initially, Applicants note that the above-quoted language from page 3 of the Office Action appears to inadvertently mischaracterize Ofek, as Ofek does not teach the transferring of information between two storage systems through a network cloud. Rather, Ofek teaches that data is transmitted between the local and remote systems through a communication link 12 "comprising fibre optic cables or high-speed data transmission lines." (col. 3, lines 52-53).

Furthermore, it is respectfully asserted that the combination of Ofek and Ohran in the manner suggested in the Office Action is improper, as the disclosures in these references specifically teach away from any such combination.

Ofek is directed to the type of sophisticated data mirroring system that Ohran discusses in the background section of his application at col. 3, line 54 through col. 4, line 52. Ohran specifically recognizes that when data is to be mirrored to a remote site, "the amount of data transferred to the remote site can be considerable. Thus, a high speed communication link must exist between the primary site and the secondary or backup site. High speed communication links are typically expensive." (col. 4, lines 37-41). Ohran further teaches that a remote mirroring system such as that of Ofek "typically requires a dedicated communication link." (col. 4, lines 62-63).

Ohran is directed to a very different type of system from that disclosed in Ofek, and attempts to minimize the amount of data transferred from the local to the remote location so that a low bandwidth communication link can be employed. (see e.g., col. 6, lines 26-33). In fact, Ohran specifically teaches that using his disclosed technique for minimizing the amount of transferred data enables the use of low bandwidth transmission media, which Ohran specifically teaches cannot be used with mirroring systems of the type disclosed in Ofek. (see e.g., col. 10, lines 14-16 and col. 20, lines 26-28).

Ohran further specifically teaches away from Ofek's technique of mirroring information in response to the information being written from the CPU to the local system, beginning at col. 25, line 55. In this respect, Ohran specifically teaches that it is an advantage of his system to not employ a mirroring technique wherein every write operation to the local system is sent to the mirror or backup storage device. (col. 25, lines 60-61). Rather, Ohran teaches that information should be sent to the backup system only at pre-selected time intervals, and that only information changed during a particular time interval be sent to the backup system. (See e.g., col. 6, lines 19-33; col. 11, lines 19-37 and col. 25, line 43-col. 26, line 12).

As seen from the foregoing, the specific teachings of Ohran are that updates from the local storage device to the backup storage device should not be performed in response to the writing of information from the CPU to the local storage system, but rather, such transfers should be performed only at pre-selected time intervals based upon data that has changed since the last time interval. Consequently, contrary to the assertion in the Office Action, one of ordinary skill

in the art looking solely to the teachings of Ofek and Ohran, without the hindsight benefit of seeing Applicants' invention, would not have been motivated to modify Ohran's system to mirror information based upon the writing of information from the CPU to the local storage system. The Office Action asserts that one skilled in the art would have been motivated to make such a modification to increase reliability and improve the performance of the Ohran system. However, Ohran specifically teaches that making such a modification would decrease system reliability (see e.g., col. 25, line 62-col. 26, line 12). In addition, modifying the Ohran system in this way would actually degrade system performance, as it would result in the transfer of significantly more data from the local system to the remote system, and this increased data would not be well-tolerated by the low bandwidth communication link that Ohran employs.

Similarly, Applicants note that there is nothing in the teachings of Ohran that would motivate one of ordinary skill in the art to modify the Ofek system to employ anything other than a dedicated high-speed data transmission line. In this respect, while Ofek teaches two asynchronous procedures for the transferring of data from the local to the remote storage system (see e.g., col. 10, line 55-col. 11, line 6), each of these systems performs the mirroring of data in response to information written from the CPU to the local storage system. Since the Ofek system does not attempt to minimize the data transmitted in the way taught by Ohran, one of ordinary skill in the art would not have been motivated to substitute Ohran's lower bandwidth transmission media in the Ofek system, as this could drastically degrade the performance of the Ofek system.

As seen from the foregoing, the combination of Ohran and Ofek under 35 U.S.C. §103 is improper, so that the rejection of claims 1-3, 10-11, 18-19, 39-41, 46-49, 51-52 and 61 under §103 over this combination of references should be withdrawn.

In ¶4 of the Office Action, claims 5, 9, 13-14, 22-37, 45 and 53-55 (including independent claims 22, 31, 37 and 53) are rejected under 35 U.S.C. §103 as being obvious over Ohran and Ofek in view of Sparks. Since the combination of Ofek and Ohran under 35 U.S.C. §103 is improper for the reasons discussed above, the combination of these two references further in view of Sparks is also improper. Therefore, the rejection of claims 5, 9, 13-14, 22-37, 45 and 53-55 under 35 U.S.C. §103 as being obvious over Ohran, Ofek and Sparks should be withdrawn.

In connection with the rejection of claims 5, 9, 13-14, 22-37, 45 and 53-55, the Office Action further asserts that it is "well known that wireless connections such as satellites provide a large transmission capacity and improve reliability due to the lack of wires." Applicants respectfully traverse this assertion to the extent that it suggests that there is any well known prior art that would have motivated one of ordinary skill in the art to modify any of the prior art references of record to arrive at the claimed invention.

In ¶5 of the Office Action, claim 6-8, 12, 15-16, 20-21, 42-44, 50 and 56-58 (including independent claim 56) are rejected under 35 U.S.C. §103 as being obvious over Ohran and Ofek in view of Staheli. Staheli has been relied upon solely to teach the use of specific types of communication links, and does not remedy the impropriety of combining Ohran and Ofek as discussed above. Therefore, since the combination of Ohran and Ofek under 35 U.S.C. §103 is improper, the rejection of claims 6-8, 12, 15-16, 20-21, 42-44, 50 and 56-58 under 35 U.S.C. §103 as being obvious over Ohran, Ofek and Staheli is improper for at least the same reasons. Consequently, the rejection of these claims under 35 U.S.C. §103 as being obvious over this combination of references should be withdrawn.

In ¶6 of the Office Action, claims 4, 17, and 59-60 (including independent claim 59) are rejected under 35 U.S.C. §103 as being unpatentable over Ohran in view of Ofek and Black. Black has been relied upon solely to teach the use of certain types of communication links, and does not remedy the impropriety of combining Ohran and Ofek as discussed above. Therefore, since the combination of Ohran and Ofek under 35 U.S.C. §103 is improper, the rejection of 4, 17 and 59-60 under §103 as being obvious over Ohran, Ofek and Black is improper for at least the same reasons. Consequently, the rejection of these claims as being obvious over this combination of references should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If it is believed for any reason that the application is not in condition for allowance, the Examiner is requested to call the

Applicants' attorney at the number listed below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

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